The Conservation Strip

CONSERVING NATURAL RESOURCES FOR A BETTER ENVIRONMENT

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Stream Monitoring Methods

There are several ways to measure water quality in local ponds and streams. Two of the most common methods are *biological* and *chemical* monitoring. Both methods are used by various groups in Fauquier County.

Each of these methods can be broken down into more specific categories. Biological monitoring could involve a study of fish or plant populations. The method employed by groups in Fauquier involves *macroinvertebrate* monitoring. As the name implies, macroinvertebrates are creatures without backbones that are large enough to be seen without the aid of microscopes or magnifying glasses.

Most macroinvertebrates are the larval stages of insects, but also included are aquatic worms, leeches, snails, clams, and a few other species. Many of these aquatic life forms have life cycles that last one to two years, so their populations provide a picture of conditions in the stream over a relatively long period of time. Streams are monitored on a quarterly basis using a protocol developed by Dr. Reese Voshell of the Entomology Department at Virginia Tech. Some macroinvertebrates are intolerant of pollution and found only in clean waters. Others vary in the amount of pollution they can tolerate. The macros are collected in shallow riffles using a kick seine, then sorted and counted by species. Using a mathematical formula developed by Dr. Voshell, the stream receives a score between 0-12, with scores 7 and above considered 'acceptable'. A high proportion of intolerant species like mayflies and stoneflies would be expected in a high scoring stream, while a high proportion of pollution tolerant species like worms, leeches, midges, and black flies would be expected in low scoring streams.

Some groups in Fauquier are engaged in chemical monitoring. While there are hundreds of tests that could be performed, the most common ones involve: testing for pH, dissolved oxygen, nitrates, phosphates, suspended solids, and fecal coliform. Some tests are performed in the field with various kits and/or meters, while others involve taking samples and sending them to certified water testing labs.

One method is not necessarily better than another, and each has advantages and disadvantages. A main advantage of macroinvertebrate monitoring involves the long life cycles of the aquatic life forms that are collected. Also, there are no electronic instruments to break or chemicals to handle. Disadvantages include trying to monitor under extreme weather conditions and high or low water flows. Also, consistent low scores for a particular stream may do little to give an indication of what might be causing the water quality problem. Chemical testing can give an indication of what might be causing a water quality problem and tell researchers where to look for sources of pollution. However, a chemical test gives a snapshot for one particular day and may not be indicative of long term conditions. Also, testing meters can be hard to calibrate and chemicals in test kits have shelf lives that must be taken into account.

Volunteers collect a macroinvertebrate sample with a kick seine at a Virginia Save Our Streams training session in Sperryville.

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Teacher's Corner

District staff members are available to make **classroom presentations** on a variety of natural resource related SOL topics. The most popular programs requested include **Soils, Watersheds, Pollution, and Erosion** (using the Enviroscape model), and **Trees**. Over 1,000 students took part in last year's classroom presentations.

The Soils program is most appropriate for third grade students. The Enviroscape model can be used for various grade levels, as can the Tree program. A 3-fold brochure describing District offerings has been sent to all schools. In addition, the District now has a Groundwater Flow Model which can be used for Middle and High School programs.

For several years, the District has been working with high school Biology Teachers at Fauquier and Liberty with **stream and pond monitoring** projects. On a monthly basis, students perform various water tests and sample aquatic life with nets and seines. The District is well stocked with equipment and supplies for aquatic studies, and would be happy to work with any school on field days or field trips to local streams and ponds for hands-on activities. Classroom presentations on water quality testing and aquatic life can also be planned.

While **field trip** budgets may be tight, consider a local visit to a site in Fauquier County. There are several locations that offer great opportunities for natural resource/environmental activities. District staff can help plan activities, and meet groups at locations around the county. Sites to consider include Crockett Park, Monroe Park, Sky Meadows State Park, Whitney State Forest, the Warrenton Greenway, Marshall Schoolhouse #18, and the Fauquier Outdoor Lab to name a few.

Students at Grace Miller Elementary School learned about watersheds and erosion by using the Enviroscape model.

For any additional information on projects and activities available to classroom teachers, contact Chuck Hoysa at the John Marshall SWCD at 540-347-3120 x 3, or by email at chuck.hoysa@va.nacdnet.net.

2006 Envirothon Competition

The **Envirothon** is an annual competition sponsored by Canon, in which winning state/provincial teams compete for recognition and scholarships by demonstrating their knowledge of environmental science and natural resource management. It is widely considered to be the premiere competition of its type in the country. The teams, each consisting of five high school-aged students, exercise their training and problem-solving skills in a competition centered on four universal testing categories **(soils/land use, aquatic ecology, forestry, and wildlife)** plus a current environmental issue.

Virginia has placed second in each of the last two years at the national competition. Each team member received a college scholarship and Canon products.

Team members must be in grades 9-12 and organized through a school science class, ecology club, 4-H club, or home school group. Team members meet on a regular basis throughout the school year to train with the assistance of local natural resource professionals.

The Envirothon contest is coordinated through the Virginia Association of Soil and Water Conservation Districts. There will be a local contest in April for teams from Fauquier and surrounding counties. The winner will advance to the State contest in May at the 4-H Center in Front Royal.

Anyone interested in forming a team or obtaining additional information should call the John Marshall SWCD at 540-347-3120 x 3.

Control Options for Pond Weeds

As summer winds down, many landowners notice that their ponds, which were clear back in April or May, are now covered by a thick layer of weeds. Most of these weeds will die out in the next few weeks, but it is very likely that the cycle will start all over again next spring, and the pond will again be covered by weeds next summer.

There are many reasons why weeds can become a problem in ponds, and there are many ways to combat them. No method is easy or foolproof, but Louis Helfresh, Extension Specialist at Virginia Tech and his colleagues do have suggestions. Some aquatic plant growth in ponds and lakes can be beneficial for fish and wildlife. The plants provide food, dissolved oxygen, and spawning and nesting habitat for fish and waterfowl. Aquatic plants can trap excessive nutrients and detoxify chemicals.

However, dense growths (over 25% of the surface area) of algae and other water plants can seriously interfere with pond recreation and threaten aquatic life. Water plants can restrict swimming, boating, fishing, and other water sports. Water plants can impart unpleasant taste (musty flavor), decaying vegetation emits offensive odors (rotten egg smell), and algae can discolor pond waters. Dense growths of plants can cause night time oxygen depletion and fish kills. Green plants produce oxygen in sunlight, but they consume oxygen at night. Decomposing water weeds can also deplete the oxygen supply, resulting in sport fish kills from suffocation. Dense plant growths can provide too much cover, preventing predation, and leading to stunted (small-sized) sport fish populations.

Most pond weed problems can be traced to excessive nutrients. Fertilizer in water does the same thing as fertilizer on land, it promotes plant growth. Excess nutrients in water usually come from fertilizer or animal waste that drains into a pond from adjacent cropland, pastures, or lawns. Whether a pond is on the farm, in the backyard, or in a subdivision, reducing nutrient inputs is the first step in reducing weed problems. There are many ways to reduce nutrient inputs. They include reducing fertilizer use adjacent to the pond, fencing out animals, allowing vegetation to grow into filter strips, divert runoff away from ponds, and avoid feeding ducks and fish. Ponds in backyards and subdivisions are often mowed right to the water's edge for a manicured look. Leaving a strip of tall unmowed grass along the bank slows the water flow and allows nutrients to filter into the soil where they will grow grass instead of reaching the pond and growing weeds. If mowing must be done near a pond, point the discharge shoot away from the water to keep clippings out of the pond.

Many ponds are constructed so water levels can be controlled. Drawing the water down in winter to expose weeds to freezing conditions is effective for some weeds, including cattails. Pond banks can also be deepened while the water is down so they have a 3:1 slope . This will reduce weeds, because many common weeds will not root in the deeper water.

The Chinese grass carp (Ctenopharyngodon idella) is a plant-eating fish that can be stocked in ponds to provide effective, economical plant control. A permit is required from the Virginia Department of Game and Inland Fisheries. The Department can be reached at(804) 367-1000, and they will send an application package and information on how and where to obtain the fish. Grass carp are usually recommended for larger ponds, and may take a few years to be effective.

Herbicides are also an option. Most farm supply stores carry an assortment of herbicides labeled for pond use. Weeds must be properly identified, as not all herbicide products control all weeds. Also, there may be restrictions on using the pond for fishing, swimming, irrigation, and livestock watering. These restrictions will be on the label. Heavily infested ponds are usually treated one section at a time to prevent fish kills caused by massive amounts of dead plant material sinking to the bottom. The dead plants can cause an oxygen depletion as they decompose.

Additional information is available in the Virginia Cooperative Extension publication 'Control Methods For Aquatic Plants in Ponds and Lakes', Publication Number 420-251. It is available online at http://www.ext.vt.edu/pubs/fisheries/420-251/420-251.html.

'Reining in the Storm' With Low Impact Development

A Low Impact Development forum entitled '**Reining in the Storm in Fauquier County – Innovative Approaches to Stormwater Management'** will be held October 12 in the Rice Theater at Highland School in Warrenton. The program, which starts at 7:00 pm, is open to planners, developers, government officials, and all interested citizens. The John Marshall SWCD and six other agencies are sponsoring the event.

Low Impact Development (LID) is a relatively new design strategy for stormwater management. Rather than moving water offsite to large end-of-pipe facilities, LID handles runoff through small cost effective landscape features located at the lot level. These features may include open space, rooftops, permeable pavements, and medians. The goal of LID is to mimic nature's rain cycle by maintaining and replicating the natural hydrologic patterns that a landscape had before development. LID uses design techniques that infiltrate, filter, store, evaporate, and detain stormwater. Forum speakers will explain LID concepts and describe projects implemented in the area.

Rain gardens are featured in many LID projects. Instead of filling in low spots and directing water to storm drains, a rain garden allows excess water to infiltrate into the ground, be absorbed by plant roots, and transpired through foliage.

Thinking of Building a Pond?

A Land Disturbing Permit (LDP) is required for building a pond in Fauquier County that will disturb more than 10,000 square feet. This area includes all disturbances to build the pond and gain access to it. Fauquier County also requires a zoning permit for the construction of any pond, regardless of size.

For ponds requiring a LDP, an erosion and sediment control plan must also be submitted for approval by the County and the John Marshall SWCD. The E&S plan must include a narrative section describing the project, and the plan must meet requirements stated in the Virginia E&S Control Handbook. In most cases, an engineered plan will be required.

The Department of Environmental Quality (DEQ) and the Corps of Engineers may require state or federal permits if the pond will be associated with a live stream or wetlands. All applicable permits must be obtained prior to obtaining a LDP.

Landowners will have to hire their own engineer and construction company to build a pond. There are no government agencies that design and build ponds.

To obtain additional information, call the John Marshall SWCD at 347-3120 x 3, or Fauquier County Community Development at 347-8708. The following websites also have information and forms:

JMSWCD - http:// www.fauquiercounty.gov/government/departments/jmswcd

Fauquier County - http://www.fauquiercounty.gov/government/departments/commdev/index.cfm?a

DCR - http://www.dcr.virginia.gov/

DEQ - http://gisweb.deq.virginia.gov/permitexpert/

COE - http://www.nao.usace.army.mil/Regulatory/Regulatory.html

Enhanced Cover Crop and Cropland Conversion

The conservation value of winter cover crops and the conversion of cropland to pasture or hayland has received increase emphasis in the Virginia Agricultural Best Management Program.

The winter cover practice involves planting certain small grain cover crops on cropland by November 1 with an incentive payment of $20/acre. This payment is increased by $15 per acre when the cover crop is planted by October 10, plus an additional $5/acre payment is made for planting Abruzzi Rye. A tax credit of 25% of the total eligible planting cost incurred by the cooperator is also available. The cover crop must be killed or grazed no earlier than March 15, or no later than May 15. Harvesting, other than by grazing, is not permitted.

Cropland conversion to pasture or hayland involves planting permanent forage or hay species on existing cropland with a minimum commitment of 10 years. Lime and fertilizer application at time of establishment must meet soil test recommendations. A $50/acre incentive payment is available, plus 75% cost-share of eligible planting costs and a 25% tax credit for expenses incurred by the cooperator.

Contact the John Marshall SWCD at 540-347-3120 ext 3 for further information or assistance.

(***Stream Monitoring*** *- Continued from page 1)*

Because of these and other variables, it is easy to see why long term monitoring programs are preferred over one time 'spot checks'. Groups that collect data in Fauquier County report their findings to the Department of Environmental Quality and/or the Virginia Save Our Streams program. There are over 50,000 miles of streams in Virginia, and DEQ employs only a handful of people to conduct stream monitoring. They can only monitor a small portion of the streams in Virginia, and they depend on citizen groups and volunteers to provide data from throughout the State. While data collected by volunteer groups is not used to make water quality management decisions, it can be used by DEQ personnel to identify trends and direct where further field studies may be justified.

In some cases, citizen groups monitor local streams to develop benchmark data so effects of future development and land use practices can be followed. In other cases, monitoring can be used to test the effectiveness of conservation practices established in a watershed. Throughout Virginia, including Fauquier, many landowners have planted riparian buffers, fenced streams, and developed nutrient management plans in efforts to improve water quality.

In Fauquier, there are citizen groups that monitor Cedar Run, and Goose Creek. The John Marshall SWCD monitors several tributaries of the Rappahannock, and both Liberty and Fauquier High Schools have monitoring programs involving their biology and ecology students. For more information on stream monitoring, contact the John Marshall SWCD at 540-347-3120 x 3.

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Natural Resources Conservation Week

The Virginia Association of Soil and Water Conservation Districts and its 47 local conservation districts have set aside **October 16-22** as Natural Resources Conservation Week. This year's theme **"Celebrate Conservation"** highlights the progress made in protecting and improving our natural resources over the past fifty years.

For years, government agencies, conservation organizations, and private individuals have worked quietly and without fanfare to improve the soil, water, air, plants and animals we all depend upon. We all benefit from these conservation efforts. For example, over the past fifty years, food production has grown more than 40 percent, even though the number of people on earth has doubled. Despite rapidly growing urban areas, forests still cover one third of the land in the U.S. and half the state of Virginia. Some experts think there are more trees today than when Columbus landed. Thirty years ago, only a third of America's rivers and streams were safe for fishing and swimming. By 1994, 86 percent of them were safe. Over the past five years, Virginians have planted grass, trees, and shrubs along more than a thousand miles of streams to keep pollutants out of waterways and the Chesapeake Bay.

Educational materials for Natural Resources Conservation Week target grades 3,4,and 7. They are available online at www.vaswcd.org/natresources.htm. In addition to this year's theme, materials from previous years is also available with the click of a button. There are great materials on soils, food production, and trees ready to print off the website. The John Marshall SWCD would be happy to assist any teacher in planning and conducting classroom activities for Conservation Week. Contact the District at 540-347-3120 x 3 for more information.

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